915-410-1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re Application of :

J. Räsänen et al :

Filed: Herewith :

For: FLEXIBLE DATA RATE CHANGE IN A MOBILE NETWORK

Assistant Commissioner for Patents
U.S. Patent and Trademark Office
Washington, D.C. 20231

PRELIMINARY AMENDMENT A

Sir:

Please preliminarily amend the above-referenced application as follows:

IN THE SPECIFICATION:

Please insert the following text prior to line 4:

--CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation of International Application PCT/EP99/04328 having an international filing date of June 22, 1999 and from which priority is claimed under all applicable sections of Title 35 of the United States Code including, but not limited to, Sections 120, 363 and 365(c).

BACKGROUND OF THE INVENTION

1. Field of the Invention--.

At page 1, line 10, cancel the heading and insert the following:

--2. Discussion of Related Art--.

The paragraph beginning at page 1, line 23 has been rewritten as follows:

Especially in case of a mobile telecommunication network, changing of the data rate should be effected such that the data transmission is not disrupted. Otherwise, the data rate change would worsen the quality of service.

The paragraph beginning at page 1, line 28 has been rewritten as follows:

Recently modems have been proposed which are able to effect a seamless data rate change. That is, such modern modems, e.g., ITU-T V.34, can (re)negotiate the data rate, i.e., upgrade and downgrade the data rate, during the call. This feature is useful in the beginning of the call in order to adapt to the prevailing conditions, or even during the call to optimize the throughput by adapting to changing conditions.

The paragraph beginning at page 2, line 8 has been rewritten as follows:

The impact of the change of line rate on the terminal is at its best just an increased or decreased use of flow control in the data terminal equipment/data communications equipment data terminal equipment/data communications equipment (DTE/DCE) interface.

The paragraph beginning at page 2, line 21 has been rewritten as follows:

Reference numeral 1 denotes a radio access network (RAN). This network can be a GSM network or a UMTS network, for example. Reference numeral 2 denotes a mobile station MS which is connected over an air (radio) interface with a base station BS 3 of the radio access network (RAN) 1. The radio access network 1 is controlled by a mobile services switching center (MSC) 4. The MSC 4 controlling the base station 3 comprises an Interworking Function (IWF) controller which performs communication with a second network 5, which is in this embodiment a fixed network, e.g., a Public Switched Telephone Network (PSTN). The fixed network 5 comprises a PSTN network controller 6 in which a modem is included which will be referred to as PSTN modem in the following.

The paragraph beginning at page 2, line 35 has been rewritten as follows:

For such a network system, transparent bearer services are defined to support a constant data rate end to end. In a 3.1 kHz audio (= modem) case, this means that the data rate in the GSM traffic channel (between the MS 2 and the MSC IWF 4) and in the PSTN network leg (between the MSC IWF 4 and the PSTN controller) are the same. If this were not the case, data would be lost (due to a buffer overflow) or duplicated (due to a buffer underflow) in the MSC IWF modem.

The paragraph beginning at page 3, line 9 has been rewritten as follows:

It is necessary that in both legs data are transmitted using the same data rate. Hence, if in such a case the data rate is to be changed, the quality of service and transmission is affected by this change, since due to changing of the data rate, the data transport can be discontinued, even in the case when the MS 2 and/or the MSC 4 comprise modems which are able to perform a seamless rate change as described above.

The heading at page 3, line 18 has been rewritten as follows:

DISCLOSURE OF INVENTION

The paragraph beginning at page 3, line 20 has been amended as follows:

The object underlying the invention is to eliminate the above drawbacks of the prior art and to provide a network system and a method by which the data rate can be changed seamlessly even in a case where data with a new data rate are transmitted and an asynchronous data rate change has to be performed.

The paragraph beginning at page 6, line 1 has been rewritten as follows:

Fig. 3A shows a transmission frame to which fill data are added, and

Fig. 4 shows a terminal, according to the invention.

The paragraph beginning at page 6, line 4 has been rewritten as follows:

Fig. 3B shows a transmission frame from which fill data are removed.

The heading at page 6, line 7, has been rewritten as follows:

BEST MODE FOR CARRYING OUT THE INVENTION

The paragraph beginning at page 7, line 28 has been rewritten as follows:

The IWF controller 41 goes on using the original rate traffic channel i.e. the original transmission rate of the mobile network 2 but adds fill data in the transmission frames. A user data field in the transmission frames, as indicated above, thereby vary in length.

The paragraph beginning at page 7, line 33 and ending at page 8, line 8 has been rewritten as follows:

This is described in the following with respect to Fig. 3A. In detail, Fig. 3A shows a transmission frame. Fill indication FI indicates that there is no fill in the frame while using a user data rate DR1 which is the original user data rate used before a request for a data rate change in the mobile network. After a request for a data rate change has been received, the IWF controller 41 adds fill data (dummy data) FD to the transmission frame corresponding to the new user data rate DR2. Thus, the original bit rate i.e. the original transmission rate of the traffic channels can stay unchanged.

At page 8, after line 16, the following paragraph has been added:

The terminal or mobile station MS 2, as shown in Fig. 4, has means 50 for receiving transmission frames from the network 1 on a line 52 from an antenna 54. Besides simply receiving the signal on the line 52, the means 50 may carry out other signal conditioning functions to condition the incoming signal for further processing but otherwise not related to the present

invention. A duplexer (not shown) is provided for providing the signal on the line 52 as well as for receiving a signal on a line 56 from a means 58 for transmitting transmission frames on a radio interface 60 to the base station 3 of the network 1. The means for receiving transmission frames provides same on a line 62 to means 64 for detecting a change in the amount of fill data in the received transmission frames.

The paragraph beginning at page 8, line 18 has been rewritten as follows:

The means 64 of mobile station MS 2 detects the fill indications in the received frames and discards the fill such that the user data can be utilized as before. After detecting the fill, i.e., the change of data rate between the modems, the MS 2 starts sending a corresponding amount of fill with the fill indication towards the IWF modem 42. This is indicated in Fig. 4 by the means 64 providing a signal on a line 66 to a means 68 for changing the user data rate provided on a line 70 to the means 58 for transmitting transmission frames. Of course a signal processor will perform other signal processing tasks not related to the present invention in response to incoming transmission frames on a line 74 either from the means 64 or directly from the means 50. Similarly, the signal processor 72 will provide outgoing data on a line 76 to the means 68 for insertion in the information field of the transmission frames. It will be realized that one or more of the functional blocks 50, 58, 64, 68 can be carried out in the signal processor 72.

The paragraph beginning at page 9, line 12 has been rewritten as follows:

Such a request is indicated by the IWF modem 42 on its own initiative or in response to detecting a data rate change upwards in the fixed network 5. This can take place if the data rate is

lower than the original user data rate negotiated in the corresponding call setup.

The paragraph beginning at page 9, line 22 has been rewritten as follows:

This is described in the following with respect to Fig. 3B. In detail, Fig. 3B shows another transmission frame. The fill indication FI indicates that there is fill (FD) in the frame (FD itself may contain the length indication at the FD field) while using a user data rate DR1' which is the original user data rate used before receiving a request for a data rate change in the mobile network. After a request for a data rate change has been received, the IWF controller 41 removes fill data (dummy data) FD from the transmission frame corresponding to the new user data rate DR2'. It has to be noted that usually always fill data actually not used may be present in data frames.

The paragraph beginning at page 10, line 1 has been rewritten as follows:

In a way analogous to the first case described above, the IWF controller 41 indicates the absence of fill data in the transmission frame by an indicator FI in the frame. For example, this can be included in redundant bits of the frame structure itself, e.g., in the frame header. If the amount of fill is just reduced, the indicator FI indicates the presence of fill (FD) and the amount of the remaining fill is indicated for example by a length indication on the FD field itself.

The paragraph beginning at page 10, line 11 has been rewritten as follows:

After detecting the absence or reduction of fill data in the means 64, i.e. the change of data rate between the modems, the means 68 changes the user data rate and MS 2 starts sending

transmission frames in which a corresponding amount of fill data are removed towards the IWF modem 42.

The paragraph beginning at page 10, line 17 has been rewritten as follows:

The IWF modem 42 (or the IWF controller 41) empties its buffer 43 to compensate for the difference between incoming and outgoing data rates before the MS 2 adapts to the increased data rate. If the IWF buffer 43 is about to run prematurely empty before the adaptation of the MS, the IWF controller 41 sends protocol fill data (e.g., frame delimiters (flags) or supervisory frames) towards the PSTN controller 6 of the fixed network 5.

The paragraph beginning at page 10, line 30 has been rewritten as follows:

If any fill (FD) is still left, it is inserted by the transmitting entity (MS, IWF) and removed by the receiving entity (IWF, MS), letting the original bit rate of the traffic channel stay unchanged.

The paragraph beginning at page 11, line 5 has been rewritten as follows:

By the above described method, it can be achieved that the connection channel, i.e., the 'leg', between the MSC IWF controller 41 and the MS on the one hand and the connection channel between the MSC IWF controller 41 and the fixed network (i.e., via the PSTN controller 6) can be separated completely. That is, a difference in the data rate can be handled and it is also no problem that both channels ('legs') are protocolwise different. Moreover, the user data rate can change seamlessly, i.e., there is no disruption of the transmission.

The paragraph beginning at page 11, line 19 has been rewritten as follows:

In GSM transmission frames, there are currently redundant status (S) bits and redundant frame numbering (#) bits and NIC bits. These bits can be used to indicate the presence/absence of fill data. If the redundant or unused bits are permanently set to ONE, this value can be used as the "absent" value. The more bits are used, the better error protection coding can be used.

The paragraph beginning at page 12, line 4 has been rewritten as follows:

As is described above, the present invention discloses a network system, in which data is transmitted in the form of transmission frames, comprising a network control unit 4 for controlling communication in the network; and a terminal 2 for receiving and transmitting data from/to said network control unit 4; wherein said network control unit 4 is adapted to receive a request for changing a data rate from a first user data rate to a second user data rate, said network control unit 4 adds/deletes fill data FD to/from a transmission frame corresponding to the requested change of data rate for transmitting data to said terminal 2 at said second data rate; and said terminal 2 is adapted to detect the change in the amount of fill data FD and to change the user data rate for transmitting data to said network control unit 4 according to the detected change. In this system, it is possible to smoothly change the data rate without affecting the quality of service.

IN THE CLAIMS:

1. (Amended) A network system, in which data is transmitted in form of transmission frames, comprising

a network control unit (4) for controlling communication in a network (1); and

a terminal (2) for receiving and transmitting data from/to said network control unit (4) at a transmission data rate; wherein

said network control unit (4) is adapted to receive a request for changing a user data rate from a first user data rate to a second user data rate,

said network control unit (4) adds/deletes fill data (FD) to/from a transmission frame corresponding to the request for changing said user data rate for transmitting data to said terminal (2) at said second user data rate with a change in amount of fill data (FD); and

said terminal (2) is adapted to detect the change in the amount of fill data (FD) and to change the user data rate for transmitting data to said network control unit (4) according to the detected change.

2. (Amended) The network system according to claim 1, wherein said terminal (2) adds/deletes fill data corresponding to the request for changing said user data rate in transmission frames for data transmitted from said terminal (2) to said network control unit (4) for transmitting data to said network control unit (4) at said second user data rate.

4. (Amended) The network system according to claim 1, wherein said terminal (2) discards said fill data (FD) when receiving said transmission frames.

5. (Amended) The network system according to claim 1, wherein said network control unit (4) indicates presence of fill data (FD) in a predetermined part of said transmission frame.

6. (Amended) The network system according to claim 4, wherein said network control unit (4) indicates an amount of fill

data (FD) in a predetermined part of said transmission frame.

7. (Amended) The network system according to claim 1, wherein said network control unit (4) indicates absence of fill data (FD) in a predetermined part of said transmission frame.

8. (Amended) The network system according to claim 2, wherein said terminal (2) is adapted to detect said second user data rate from a fill data absence/presence indication and from a fill data amount indication in said transmission frame.

9. (Amended) The network system according to claim 1, wherein said network control unit (4) comprises a network interworking means (41, 42) which is adapted to provide an interface between said network (1) and a second network (5).

10. (Amended) The network system according to claim 9, wherein said network interworking means (41, 42) is adapted to receive said request for changing the user data rate from said second network (5).

11. (Amended) The network system according to claim 9, wherein said network interworking means (41, 42) initiates said request for changing the user data rate.

12. (Amended) A network control method, in which data is transmitted in a form of transmission frames between a network control unit (4) for controlling communication in a network (1) and a terminal (2) for receiving and transmitting data from/to said network control unit (4) at a transmission data rate, comprising the steps of:

receiving a request for changing a user data rate from a first user data rate to a second user data rate,

adding/deleting an amount of fill data (FD) to/from a transmission frame corresponding to the request for changing the user data rate for transmitting data from said network control unit (4) to said terminal (2);

detecting by said terminal (2) a change in the amount of fill data (FD) in said data frame and

changing the user data rate used by said terminal (2) for transmitting data to said network control unit (4) according to the detected change.

13. (Amended) The method according to claim 12, further comprising the step of

adding/deleting fill data corresponding to the request for changing said user data rate in transmission frames for data transmitted from said terminal (2) to said network control unit (4) for transmitting data to said network control unit (4) at said second data rate.

14. (Amended) The method according to claim 13, wherein the transmission data rate remains unchanged upon changing the user data rate.

15. (Amended) The method according to claim 12, further comprising the step of discarding said fill data (FD) in said terminal (2) when receiving said transmission frames.

16. (Amended) The method according to claim 12, further comprising the step of indicating presence of fill data (FD) in a predetermined part of said transmission frame.

17. (Amended) The method according to claim 16, further comprising the step of indicating an amount of fill data (FD) in a predetermined part of said transmission frame.

18. (Amended) The method according to claim 12, further comprising the step of indicating absence of fill data (FD) in a predetermined part of said transmission frame in case of a upwards change of said user data rate.

19. (Amended) The method according to claim 17, wherein said step of detecting is performed by detecting a fill data absence/presence indication and from a fill data amount indication in said transmission frame.

20. (Amended) The method according to claim 1, wherein said request for a data rate change is issued by a second network (5).

21. (Amended) The method according to claim 1, wherein said request for changing the user data rate is initiated by said network interworking means (41, 42).

22. (Amended) A terminal for a network system comprising at least one network control unit and at least one terminal,

in which system data is transmitted in transmission frames which may include fill data, the terminal comprising:

means for receiving transmission frames from the at least one network control unit (4);

means for transmitting transmission frames to said network control unit detecting a change in an amount of fill data (FD) in received transmission frames; and

means for changing a user data rate for the transmission of data to said network control unit (4) according to the detected change.

IN THE ABSTRACT:

The present invention discloses a network system, in which data is transmitted in the form of transmission frames, the system including a network control unit (4) for controlling communication in the networkand a terminal (2) for receiving and transmitting data from/to the network control unit (4). When the network control unit (4) receives a request for changing from a first user data rate it adds/deletes fill data (FD) to/from a transmission frame corresponding to the requested change in the user data rate for transmitting data to the terminal (2) at the second user data rate. The terminal (2) detects the change in the amount of fill data (FD) and changes the user data rate transmitted to the network control unit (4) according to the detected change. In this system, it is possible to smoothly change the data rate without affecting the quality of service.

REMARKS

This preliminary amendment is submitted for the purpose of placing the application into standard U.S. format, to correct certain informalities in the text and to insert description of Fig. 4 corresponding to original claim 22.

Respectfully submitted,

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Version with Markings to Show Changes Made

IN THE SPECIFICATION:

The paragraph beginning at page 1, line 23 has been amended as follows:

Especially in case of a mobile telecommunication network, changing of the data rate should be effected such that the data transmission is not disrupted. Otherwise, the data rate change would [worse] worsen the quality of service.

The paragraph beginning at page 1, line 28 has been amended as follows:

[Thus, recently] Recently modems have been proposed which are able to effect a seamless data rate change. That is, such modern modems, e.g., ITU-T V.34, can (re)negotiate the data rate, i.e., upgrade and downgrade the data rate, during the call. This feature is useful in the beginning of the call in order to adapt to the prevailing conditions, or even during the call to optimize the throughput by adapting to changing conditions.

The paragraph beginning at page 2, line 8 has been amended as follows:

The impact of the change of line rate on the terminal is at its best just an increased or decreased use of flow control in the data terminal equipment/data communications equipment data terminal equipment/data communications equipment (DTE/DCE) interface.

The paragraph beginning at page 2, line 21 has been amended as follows:

Reference numeral 1 denotes a radio access network (RAN). This network can be a GSM network or a UMTS network, for example. Reference numeral 2 denotes a mobile station MS which is

connected [by] over an air (radio) interface with a base station BS 3 of the radio access network (RAN) 1. The radio access network 1 is controlled by a mobile services switching center (MSC) 4. The MSC 4 controlling the base station 3 comprises an Interworking Function (IWF) controller which performs communication with a second network 5, which is in this embodiment a fixed network, e.g., a Public Switched Telephone Network (PSTN). The fixed network 5 comprises a PSTN network controller 6 in which a modem is included which will be referred to as PSTN modem in the following.

The paragraph beginning at page 2, line 35 has been amended as follows:

For such a network system, transparent bearer services are defined to support a constant data rate end to end. In a 3.1 kHz audio (= modem) case, this means that the data rate in the GSM traffic channel (between the MS 2 and the MSC IWF 4) and in the PSTN network leg (between the MSC IWF 4 and the PSTN controller) are the same. If this [was] were not the case, data would be lost (due to a buffer overflow) or duplicated (due to a buffer underflow) in the MSC IWF modem.

The paragraph beginning at page 3, line 9 has been amended as follows:

[Thus, it] It is necessary that in both legs data are transmitted using the same data rate. Hence, if in such a case the data rate is to be changed, the quality of service and transmission is affected by this change, since due to changing of the data rate, the data transport can be discontinued, even in the case when the MS 2 and/or the MSC 4 comprise modems which are able to perform a seamless rate change as described above.

The heading at page 3, line 18 has been amended as follows:
[SUMMARY OF THE] DISCLOSURE OF INVENTION

The paragraph beginning at page 3, line 20 has been amended as follows:

[Thus,] The object underlying the invention is to eliminate the above drawbacks of the prior art and to provide a network system and a method by which the data rate can be changed seamlessly even in a case where data with a new data rate are transmitted and an asynchronous data rate change has to be performed.

The paragraph beginning at page 6, line 1 has been amended as follows:

Fig. 3[a]A shows a transmission frame to which fill data are added, and

The paragraph beginning at page 6, line 4 has been amended as follows:

Fig. 3[b]B shows a transmission frame from which fill data are removed.

Fig. 4 shows a terminal, according to the invention.

The heading at page 6, line 7, has been amended as follows:

[DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS] BEST MODE FOR CARRYING OUT THE INVENTION

The paragraph beginning at page 7, line 28 has been amended as follows:

The IWF controller 41 goes on using the original rate traffic channel i.e. the original transmission rate of the mobile network 2 but adds fill data in the transmission frames. [The] A user data field in the transmission frames, as indicated above,

thereby vary in [its] length.

The paragraph beginning at page 7, line 33 and ending at page 8, line 8 has been amended as follows:

This is described in the following with respect to Fig. 3[a]A. In detail, Fig. 3[a]A shows a transmission frame. Fill indication FI indicates that there is no fill in the frame while using a user data rate DR1 which is the original user data rate used before a request for a data rate change in the mobile network. After a request for a data rate change has been received, the IWF controller 41 adds fill data (dummy data) FD to the transmission frame corresponding to the new user data rate DR2. Thus, the original bit rate i.e. the original transmission rate of the traffic channels can stay unchanged.

A new paragraph has been added at page 8, after line 16 as follows:

The terminal or mobile station MS 2, as shown in Fig. 4, has means 50 for receiving transmission frames from the network 1 on a line 52 from an antenna 54. Besides simply receiving the signal on the line 52, the means 50 may carry out other signal conditioning functions to condition the incoming signal for further processing but otherwise not related to the present invention. A duplexer (not shown) is provided for providing the signal on the line 52 as well as for receiving a signal on a line 56 from a means 58 for transmitting transmission frames on a radio interface 60 to the base station 3 of the network 1. The means for receiving transmission frames provides same on a line 62 to means 64 for detecting a change in the amount of fill data in the received transmission frames.

The paragraph beginning at page 8, line 18 has been amended as follows:

The means 64 of mobile station MS 2 detects the fill indications in the received frames and discards the fill such that the [use] user data can be utilized as before. After detecting the fill, i.e., the change of data rate between the modems, the MS 2 starts sending a corresponding amount of fill with the fill indication towards the IWF modem 42. This is indicated in Fig. 4 by the means 64 providing a signal on a line 66 to a means 68 for changing the user data rate provided on a line 70 to the means 58 for transmitting transmission frames. Of course a signal processor will perform other signal processing tasks not related to the present invention in response to incoming transmission frames on a line 74 either from the means 64 or directly from the means 50. Similarly, the signal processor 72 will provide outgoing data on a line 76 to the means 68 for insertion in the information field of the transmission frames. It will be realized that one or more of the functional blocks 50, 58, 64, 68 can be carried out in the signal processor 72.

The paragraph beginning at page 9, line 12 has been amended as follows:

Such a request is indicated by the IWF modem 42 on its own initiative or in response [of] to detecting a data rate change upwards in the fixed network 5. This can take place if the data rate is lower than the original user data rate negotiated in the corresponding call setup.

The paragraph beginning at page 9, line 22 has been amended as follows:

This is described in the following with respect to Fig. 3[b]B. In detail, Fig. 3[b]B shows another transmission frame. The fill indication FI indicates that there is fill (FD) in the frame (FD itself may contain the length indication at the FD

field) while using a user data rate DR1' which is the original user data rate used before receiving a request for a data rate change in the mobile network. After a request for a data rate change has been received, the IWF controller 41 removes fill data (dummy data) FD from the transmission frame corresponding to the new user data rate DR2'. It has to be noted that usually always fill data actually not used may be present in data frames.

The paragraph beginning at page 10, line 1 has been amended as follows:

In [an analogue] a way analogous to the first case described above, the IWF controller 41 indicates the absence of fill data in the transmission frame by an indicator FI in the frame. For example, this can be included in redundant bits of the frame structure itself, e.g., in the frame header. If the amount of fill is just reduced, the indicator FI indicates the presence of fill (FD) and the amount of the remaining fill is indicated for example by a length indication on the FD field itself.

The paragraph beginning at page 10, line 11 has been amended as follows:

After detecting the absence or reduction of fill data in the means 64, i.e. the change of data rate between the modems, the means 68 changes the user data rate and MS 2 starts sending transmission frames in which a corresponding amount of fill data are removed towards the IWF modem 42.

The paragraph beginning at page 10, line 17 has been amended as follows:

The IWF modem 42 (or the IWF controller 41) empties its buffer 43 to compensate for the difference between incoming and outgoing data rates before the MS 2 adapts to the increased data rate. If the IWF buffer 43 is about to run prematurely empty

before the adaptation of the MS, the IWF controller 41 sends protocol fill data (e.g., frame delimiters (flags) or supervisory frames) towards the PSTN controller 6 of the fixed network 5.

The paragraph beginning at page 10, line 30 has been amended as follows:

If any fill (FD) is still left, it is inserted by the transmitting entity (MS, IWF) and removed by the receiving entity (IWF, MS), letting the original bit rate of the traffic channel stay unchanged.

The paragraph beginning at page 11, line 5 has been amended as follows:

By the above described method, it can be achieved that the connection channel, i.e., the 'leg', between the MSC IWF controller 41 and the MS on the one hand and the connection channel between the MSC IWF controller 41 and the fixed network (i.e., via the PSTN controller 6) can be separated completely. That is, a difference in the data rate can be handled and it is also no problem that both channels ('legs') are protocolwise different. Moreover, the user data rate can change seamlessly, i.e., there is no disruption [on] of the transmission.

The paragraph beginning at page 11, line 19 has been amended as follows:

In GSM transmission frames, there are currently redundant status (S) bits and redundant frame numbering (#) bits and NIC bits. These bits can be used to indicate the presence/absence of fill data. If the redundant or unused bits are permanently set to ONE, this value can be used as the "absent" value. The more bits are used, the better error protection coding can be used.

The paragraph beginning at page 12, line 4 has been amended as follows:

As is described above, the present invention discloses a network system, in which data is transmitted in the form of transmission frames, comprising a network control unit 4 for controlling communication in the network; and a terminal 2 for receiving and transmitting data from/to said network control unit 4; wherein said network control unit 4 is adapted to receive a request for changing a data rate from a first user data rate to a second user data rate, said network control unit 4 adds/deletes fill data FD to/from a transmission frame corresponding to the requested change of data rate for transmitting data to said terminal 2 at said second data rate; and said terminal 2 is adapted to detect the change in the amount of fill data FD and to change the user data rate for transmitting data to said network control unit 4 according to the detected change. In this system, it is possible to smoothly change the data rate without affecting the quality of service.

IN THE CLAIMS:

1. (Amended) A network system, in which data is transmitted in form of transmission frames, comprising

a network control unit [(**4**)] (4) for controlling communication in [the] a network (1); and

a terminal [(**2**)] (2) for receiving and transmitting data from/to said network control unit [(**4**)] (4) at a transmission data rate; wherein

said network control unit [(**4**)] (4) is adapted to receive a request for changing a user data rate from a first user data rate to a second user data rate,

said network control unit [(**4**)] (4) adds/deletes fill data [(**FD**)] (FD) to/from a transmission frame corresponding to the [requested change of] request for changing said user data rate for transmitting data to said terminal [(**2**)] (2) at said second user data rate with a change in amount of fill data (FD); and

said terminal [(**2**)] (2) is adapted to detect the change in the amount of fill data [(**FD**)] (FD) and to change the user data rate for transmitting data to said network control unit [(**4**)] (4) according to the detected change.

2. (Amended) The network system according to claim 1, wherein said terminal [(**2**)] (2) adds/deletes fill data corresponding to the [requested change of user] request for changing said user data rate in transmission frames for data transmitted from said terminal [(**2**)] (2) to said network control unit [(**4**)] (4) for transmitting data to said network control unit [(**4**)] (4) at said second user data rate.

4. (Amended) The network system according to claim 1, wherein said terminal [(**2**)] (2) discards said fill data [(**FE**)] (FD) when receiving said transmission frames.

5. (Amended) The network system according to claim 1, wherein said network control unit [(**4**)] (4) indicates presence of fill data [(**FD**)] (FD) in a predetermined part of said transmission frame.

6. (Amended) The network system according to claim 4, wherein said network control unit [(**4**)] (4) indicates an amount of fill data [(**FD**)] (FD) in a predetermined part of said transmission frame.

7. (Amended) The network system according to claim 1, wherein said network control unit [(**4**)] (4) indicates absence of fill data [(**FD**)] (FD) in a predetermined part of said transmission frame.

8. (Amended) The network system according to [any of the claims 5 and 7] claim 2, wherein said terminal [(**2**)] (2) is adapted to detect said second user data rate from [said] a fill data absence/presence indication and from a fill data amount [indications] indication in said transmission frame.

9. (Amended) The network system according to [any of the previous claims] claim 1, wherein said network control unit [(**4**)] (4) comprises a network interworking means [(**41, 42**)] (41, 42) which is adapted to provide an interface between said network [(**1**)] (1) and a second network [(**5**)] (5).

10. (Amended) The network system according to claim 9, wherein said network interworking means [(**41, 42**)] (41, 42) is adapted to receive said request for [a] changing the user data rate [change] from said second network [(**5**)] (5).

11. (Amended) The network system according to claim 9, wherein said network interworking means [(**41, 42**)] (41, 42) initiates said request for [a] changing the user data rate [change].

12. (Amended) A network control method, in which data is transmitted in a form of transmission frames[, and] between a network control unit [(**4**)] (4) for controlling communication in [the] a network (1) and a terminal [(**2**)] (2) for receiving and transmitting data from/to said network control unit [(**4**)] (4) [are provided, said method] at a transmission data rate, comprising the steps of:

receiving a request for changing a user data rate from a first user data rate to a second user data rate,

adding/deleting an amount of fill data (FD) to/from a transmission frame [correspondingly] corresponding to the [requested change of] request for changing the user data rate for transmitting data from said network control unit [(**4**)] (4) to said terminal [(**2**)] (2);

detecting by said terminal [(**2**)] (2) [said] a change in the amount of fill data (FD) in said data frame and

changing the user data rate used by said terminal [(**2**)] (2) for transmitting data to said network control unit [(**4**)] (4) according to the detected change.

13. (Amended) The method according to claim 12, further comprising the step of

adding/deleting fill data [correspondingly] corresponding to the [requested change of] request for changing said user data rate in transmission frames for data transmitted from said terminal [(**2**)] (2) to said network control unit [(**4**)] (4) for transmitting data to said network control unit [(**4**)] (4) at said second data rate.

14. (Amended) The method according to claim 13, wherein the transmission data rate remains unchanged upon [the change] changing the user data rate.

15. (Amended) The method according to claim 12, further comprising the step of discarding said fill data [(**FD**)] (FD) in said terminal [(**2**)] (2) when receiving said transmission frames.

16. (Amended) The method according to claim 12, further comprising the step of indicating presence of fill data [(**FD**)] (FD) in a predetermined part of said transmission frame.

17. (Amended) The method according to claim 16, further comprising the step of indicating an amount of fill data [(**FD**)] (FD) in a predetermined part of said transmission frame.

18. (Amended) The method according to claim 12, further comprising the step of indicating absence of fill data [(**FD**)] (FD) in a predetermined part of said transmission frame in case of a upwards change of said user data rate.

19. (Amended) The method according to claim 17, wherein said [detection] step [for detecting said second user data rate] of detecting is performed by [using said] detecting a fill data absence/presence indication and from a fill data amount [indications] indication in said transmission frame.

20. (Amended) The method according to [any one of the claims 12 to 19] claim 1, wherein said request for a data rate change is issued by a second network [(**5**)] (5).

21. (Amended) The method according to [any one of the claims 12 to 20] claim 1, wherein said request for [a] changing

the user data rate [change] is initiated by said network interworking means [(**41, 42**)] (41, 42).

22. (Amended) A terminal for a network system comprising at least one network control unit and at least one terminal,

in which system data is transmitted in [the form of] transmission frames which may [comprise] include fill data, the terminal comprising:

means for receiving [being adapted to receive] transmission frames from the at least one network control unit [(**4**)] (4);

means for [transmit] transmitting transmission frames to said network control unit [(**4**) (4)[, wherein the terminal is further adapted to];

means for [detect] detecting a change in [the] an amount of fill data [(**FD**)] (FD) in received transmission frames; and [to]

means for changing [change] a user data rate for the transmission of data to said network control unit [(**4**)] (4) according to the detected change.

IN THE ABSTRACT:

The present invention discloses a network system, in which data is transmitted in the form of transmission frames, [comprising] the system including a network control unit (4) for controlling communication in the network[;] and a terminal (2) for receiving and transmitting data from/to [said] the network control unit (4)[; wherein said]. When the network control unit (4) [is adapted to] receives a request for changing [a data rate] from a first user data rate[, said network control unit (4)] it adds/deletes fill data (FD) to/from a transmission frame corresponding to the requested change [of] in the user data rate for transmitting data to [said] the terminal (2) at [said] the

second user data rate[; and said]. The terminal (2) [is adpated to] detects the change in the amount of fill data (FD) and [to change] changes the user data rate [for transmitting data] transmitted to [said] the network control unit (4) according to the detected change. In this system, it is possible to smoothly change the data rate without affecting the quality of service.

915-410-1

IN THE U.S. PATENT AND TRADEMARK OFFICE

Re application of :

J. Räsänen et al :

Filed: Herewith :

For: FLEXIBLE DATA RATE CHANGE IN A MOBILE NETWORK

PRELIMINARY AMENDMENT B

Assistant Commissioner for Patents
U.S. Patent and Trademark Office
Washington DC 20231

Sir:

Please preliminarily amend the above-referenced application as follows:

FILING OF PAPERS AND FEES BY "EXPRESS MAIL"
WITH CERTIFICATE IN ACCORDANCE WITH 37 CFR 1.10

I hereby certify that this correspondence is being deposited with the United States Postal Service on the date shown below with sufficient postage as "Express Mail" in an envelope with Mailing Label No. EV 005524129 US placed thereon prior to mailing and addressed to the Assistant Commissioner for Patents, Washington DC 20231.

Judith Schick

Judith Schick

Dated: 12-21-01

IN THE DRAWING:

Please add new Fig. 4 as shown on the enclosed sheet.

REMARKS

This preliminary amendment is submitted for the purpose of adding new Fig. 4 to illustrate the subject matter of claim 22 as per Rule 83(a).

Respectfully submitted,

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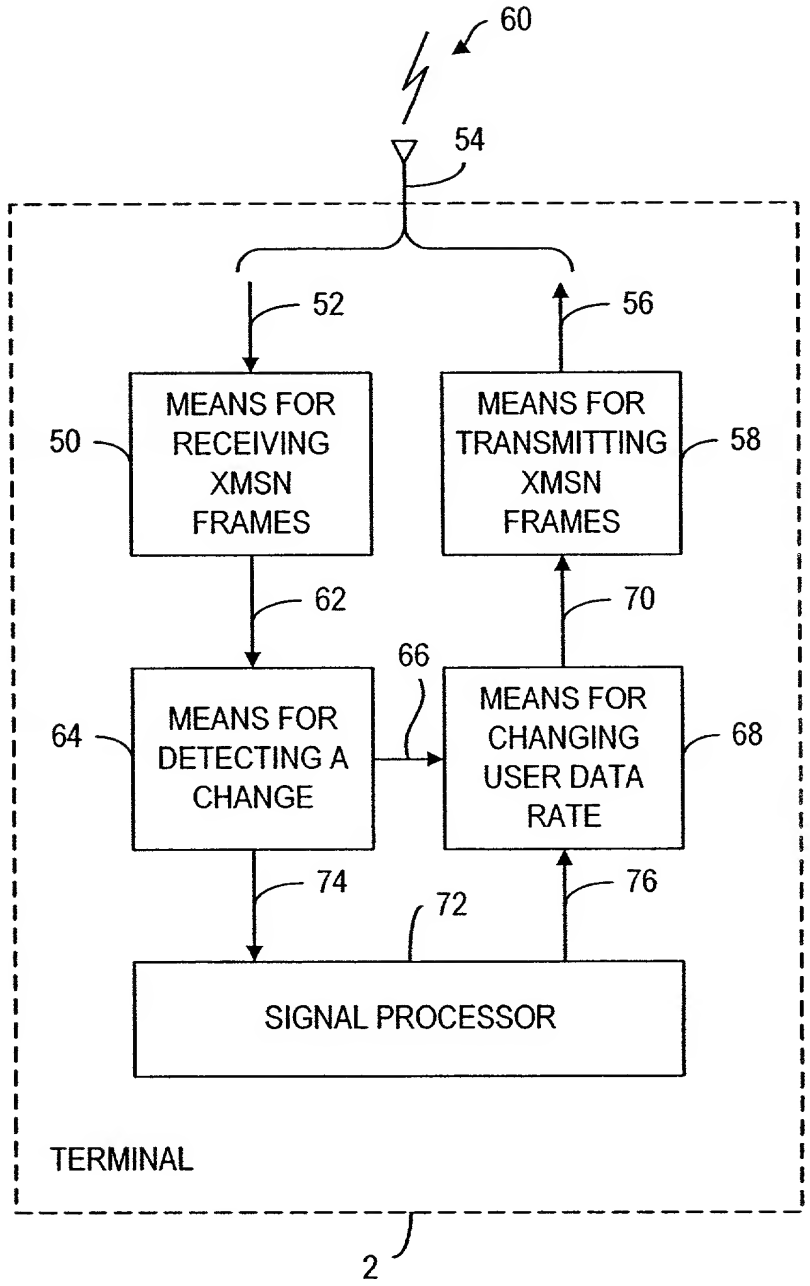
60
54
52
56
MEANS FOR RECEIVING XMSN FRAMES
50
MEANS FOR TRANSMITTING XMSN FRAMES
58
62
70
66
MEANS FOR DETECTING A CHANGE
64
MEANS FOR CHANGING USER DATA RATE
68
74
72
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SIGNAL PROCESSOR
TERMINAL
2

FIG. 4